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tric lamp. If the microscopist so manages his illuminating apparatus that the field of the microscope resembles in color and intensity the azure blue of the sky on a clear day (and this is the condition which should always be aimed at), I do not believe the use of the method for any reasonable time will be found injurious. I have recently found, when a sheet of plate glass backed with black velvet is substituted for the ordinary plane mirror in any of the above arrangements, that while the brilliancy of the light is much moderated, its desirable qualities are unchanged and it is still intense enough for the adequate illumination of the highest powers. Those who find the light obtained from the ordinary mirror too brilliant may resort to this contrivance with advantage.

SOME OF THE FAMILIAR BIRDS OF INDIA.

BY REV. H. J. BRUCE.

ONE is greatly surprised at the number of birds found in India. Dr. Jerdon in his "Birds of India," published in 1863, describes ten hundred and sixteen species, and since that time the list has been so much enlarged by new discoveries, that Mr. Allan Hume, in the second part of his "Rough Notes," announces thirteen hundred and sixty species as already acknowledged and identified. It cannot be supposed that this number includes all the avi-fauna of India, Burmah and Ceylon; for new species are constantly being discovered and added to the list as the number of observers is increased, and new localities are visited.

India possesses almost every variety of climate, from the snowy Himalayas on the north, to the arid plains and table-lands of the tropical south. The variety of surface, too, is very great. Whether upon the extended sea coast of several thousand miles, or upon the mountain cliffs and crags; in the immense forests of Malabar and Central India, or the thick jungles of the Ghauts and Ceylon; in the shady ravines or the open country; upon the large rivers and lakes or in the salt marshes, almost every kind of bird can find those conditions which are best adapted to its nature and wants. It is to be remembered also that this country forms the southern-

most limit of the Asiatic continent, and it is therefore the winter residence of a vast number of species which migrate from the colder regions of central Asia, and even from Europe. The Himalayan range forms no impassable barrier to them in their journeyings north and south; but, taking advantage of favoring valleys and mountain gorges, they have chosen for themselves great highways, over which they pass and repass as the changing seasons require. Dr. Stoliczka has recently discovered one of these highways in the valley of the Sutlej in the northwest Himalayas. This valley forms an almost direct passage through the lofty mountain ranges, from the plains of India to the elevated table-lands of Central Asia. In a distance of one hundred and ten miles it ascends from one thousand to thirteen hundred feet, and Dr. Stoliczka found there many species of birds which one would not expect to find in such an elevated mountainous region.

Rahouri is situated on the bank of the Mûla river, in the broad valley of the Godavery, twenty-three miles northwest from Ahmednuggur. The country round about is open plain, and the land for the most part is fertile. Immediately around the village are a large number of gardens which are more highly cultivated and irrigated by water drawn from wells by bullocks. There are a great many trees, of various kinds, in these gardens, and it is therefore a favorable locality for many of our familiar birds. Without attempting to include in this list all the birds found here, I propose to restrict myself to those which I have seen from my study window, and in my own garden. In front of my window, one hundred feet distant, is a thick hedge of Milkbush (*Euphorbia tirucalli*) fifteen feet high, and upon either side of the intervening space are a number of acacias and other trees. The garden is a much larger enclosure, surrounded by the same hedge and containing many trees of different kinds. With limits thus circumscribed, our list will, of course, include only a few of the most familiar birds.*

Neophron ginginianus. The white scavenger vulture. This was formerly supposed to be *N. percnopterus*, the "Pharaoh's chicken" of Egypt, but is now acknowledged as a distinct race.

Hieraëtus pennatus. The dwarf, or booted eagle. Often seen among the common kites, and it so much resembles them in size

* With two or three exceptions all the birds included in this list, and many other Indian species, may be seen in the Museum of the City Library Association in Springfield, Mass.

and general coloring that the inexperienced observer finds it difficult to distinguish the two when flying at a little distance from him. It is wary, but more predacious than the kites, not unfrequently seizing a chicken or some other small animal from the ground. But, as Dr. Jerdon says, its depredations are usually laid to the charge of the kites, for the reason that the common native people do not distinguish it from them. It is wonderful how widely extended the range of this eagle is. It is found throughout India and Burmah, in Western Asia, Southern Europe and Northern Africa, and has recently been reported from South Africa. Mr. Blyth also thinks that the Australian *Hieraëtus morphnoides*, is not to be distinguished from this species.

Poliornis teesa. The white-eyed buzzard.

Milvus Govinda. The common pariah kite. Among the first objects that attracted my attention when I landed in India were the kites and crows, and I have scarcely been out of sight of them very long at a time since. They are very abundant in all parts of India, and no representation of Indian scenery would be quite complete without some of these birds in the foreground. The common kite performs a very important office as a scavenger. It is generally seen sitting upon the ground, or upon houses or trees, or sailing about with easy and not very rapid motion over the villages or cantonments watching for any bits of refuse which may serve for food. When these are discovered the kite does not think it necessary to light upon the ground to secure them, but swooping rapidly down it seizes the prize with its claws; or if the first swoop fails a second or third quickly follows. But after seizing the coveted morsel he is a lucky fellow if he is able to retain it. Others of his own species seeing his success, will sometimes rush upon him and attack him with such fury that he is ready to drop the prize to escape from them. If unmolested, however, he will devour his spoils either upon the wing, or seated upon some neighboring house or tree. It is surprising how quickly the kites will discern an object and recognize it as an article of food. I have myself thrown a small bird out upon the ground with considerable force, and almost before it stopped rolling upon the ground, a kite, which was unseen before, swooped upon it and carried it away in triumph.

The kites are sometimes exceedingly bold and often very troublesome. The people in this country are accustomed to carry almost

every kind of burden upon the top of their heads, and it is no uncommon thing for a kite to make a sudden swoop and possess himself of a part of their burden, when it is anything that he desires for food. I have seen them attempt to seize food out of the hand of a man. It was done so quickly that the audacious robber, whether successful or not, was far away before the astonished victim could recover from his surprise. They consider it, however, much safer to take liberties with children than with older people. Several years ago my own child, then two years old, was accustomed to take a piece of bread in his hand and go out each afternoon to play in the shadow of the bungalow. On several successive days we were suddenly aroused by a great outcry from the child, and on going to him found that a kite had unceremoniously robbed him of his food. I made every effort to shoot the troublesome bird, but, as if aware of my purpose, it quickly disappeared whenever I came in sight. At length, however, after several days' manœuvring, quite contrary to its usual custom it cautiously flew over my head, and—well! it troubled the child no more.

Mr. Hume says that "there are certainly two distinct species of kites in India." The second species is much larger than *M. Govinda*, and Mr. Hume has named it *M. major*. It is "a wild wary bird, very difficult to approach and is found only in the open fields, or in swamp or jungle." Hence very few specimens of this "larger kite" have ever been obtained, although it has been repeatedly seen, recognized and pursued, both by Mr. Hume and others. Besides this, Mr. Hume thinks that it is by no means improbable that the Australian *M. affinis* and the Chinese *M. melanotis* may be found within our limits. The Indian kites seem never to have been examined with that thoroughness with which most other families of Indian birds have been. Certain it is that in the great multitude of kites all about us, there is a vast difference in many of the individuals, both in respect to size and coloring; but whether this is owing to a difference of species, or only to the conditions of age and sex, can be determined only by careful examination of a large series of specimens. *Milvus Govinda* seems to be nearly confined to India, Burmah and Ceylon. A few specimens only have been recorded from the Andaman Islands.

Athene Brama. The spotted owlet.

Cypselus affinis. The common Indian swift. Very abundant

at times, even entering verandahs and houses, and then again not seen at all for many months.

Caprimulgus Asiaticus. The common Indian nightjar.

Caprimulgus———. Nightjar. A single specimen shot upon the ground close beside the bungalow. It is of a remarkably light color, and apparently differs from any described by Dr. Jerdon.

Merops viridis. The common Indian bee-eater. There are three Asiatic varieties of this bird which Mr. Blyth thinks are "about as well worthy of separation as is the African variety from either one of them." The blue-throated variety, or Hodgson's *M. torquatus*, seems not to be uncommon in this region.

Coracias Indica. The Indian roller. This beautiful bird is regarded by the natives with great superstition. If the traveller sees it sitting upon his right, and can pass without raising it, it is a good sign; but if it is on his left he despairs of accomplishing the object of his journey. Hence he will sometimes run with all his might across the neighboring field in order to leave the bird upon the right hand side of his path.

Palæornis torquatus. The rose ringed parakeet. Very abundant and noisy, and destructive to the crops of fruit and grain. It flies with great energy, and when on the wing always seems to be in a hurry.

Hantholæma Indica. The crimson-breasted barbet. The only barbet found in this region.

Coccytes melanoleucus. The pied-crested cuckoo.

Centropus rufipennis. The common conical or crow pheasant.

Arachnecthra Asiatica. The purple honey-sucker. This is the most widely spread of all the Eastern sunbirds. The male, in breeding plumage, with its glossy, purplish black body, and crimson and yellow axillaries, is a very beautiful object. Of the thirteen species of Indian honey-suckers this is the only one found in this vicinity.

Upupa nigripennis. The Indian hoopoe.

Lanius erythronotus. The rufous-backed shrike.

Lanius Hardwickii. The bay-backed shrike.

Pericrocotus peregrinus. The small minivet.

Dicrurus macrocerus. The common drongo shrike.

Tchitrea paradisi. The Paradise flycatcher. A single specimen, a fine adult male, shot in the hot-season of 1869. It is com-

mon in the more highly wooded districts along the Western Ghauts.

Leucocerca albofrontata. The white-browed fantail. An occasional visitor to the trees in front, and always welcome for the beauty of its song as well as the oddity of its manners.

Cyornis banyumas. Horsfield's blue red-breast. The female of this bird is not, as Dr. Jerdon supposes, "olive brown above." I have repeatedly obtained undoubted females, determined by dissection, which differed from the males only in having the colors slightly more dull. An allied species, *C. ruficauda* has been found in this vicinity, but all my specimens have proved to be females. It is still a question whether this last is a good species, or whether it is the female of some other race.

Petrocosyphus cyaneus. The blue rock thrush. According to Dr. Jerdon and the Rev. H. B. Tristram this, and not *Passer domesticus* is the "sparrow" of Ps. cii, 7, that sitteth "alone upon the housetop."

Malacocircus Malcolmi. The large gray babbler. Very abundant and exceedingly noisy.

Pycnonotus pusillus. The common Madras bulbul. Distinct from the *P. hæmorrhous* (Gmelin) of authors.

Oriolus kundoo. The Indian oriole.

Copsychus saularis. The magpie robin.

Thamnobia fulicata. The Indian black robin.

Ruticilla rufiventris. The Indian redstart.

Acrocephalus dumetorum. The lesser reed warbler.

Prinia socialis. The dark ashy wren warbler.

Drymoipus longicaudatus. The long-tailed wren warbler.

Phyllophneuste rama. Sykes' warbler.

Sylvia affinis. The allied gray warbler.

Motacilla Dukhunensis. The black-faced wag tail. During the cold weather when this bird is with us its whole face to the top of its head is pure white. The observer in this latitude therefore fails to see the propriety of the English name that has been given to it.

Budytes viridis. The Indian field wagtail. The green wagtails are very difficult of identification. Mr. Hume thinks that there are at least six species in India, only two of which occur in Dr. Jerdon's list.

Corvus culminatus. The carrion crow. Of the seven species

of crows found in India only two are seen here. This species is very common but not nearly so abundant as *C. splendens*. I have never been able, however, to obtain specimens which approached in size the measurements given by Dr. Jerdon. The largest specimen, I think, that I ever obtained, measured but nineteen inches in length, whereas Dr. Jerdon gives its length as twenty-one inches.

Corvus splendens. The common Indian crow. The common Indian crow is everywhere found in surprising numbers, and it retains all the wariness and cunning which are characteristic of its class. It is amusing to see its excessive caution when it has reason to think that one has evil designs concerning it. It stands with its neck stretched forward and its wings partly spread ready for instant flight, while its eye is cocked and it watches every indication of war or peace. The slightest hostile movement, or even a steady look will often send it away; but sometimes it seems to know that it is being imposed upon, and then it merely jumps upon a more distant branch of the tree, or if on the ground flies a few feet away. It is exceedingly quick to comprehend the situation of affairs, and to avail itself of any opportunity to secure its food.

I once saw, in the city of Poona, an old woman sitting by the roadside with a basket of sweetmeats for sale. Not finding trade very brisk, however, she had leaned her head against a tree and fallen asleep. The crows seemed to comprehend the case at once, and they began to sidle up, in their own peculiar way, to help themselves to the contents of the basket. Probably the old woman found them anything but profitable customers.

There seems to be an element of justice in the constitution of this crow, as well as in some of its congeners, at least they are accustomed occasionally to inflict punishment upon certain guilty members of their community. I was once fortunate enough to witness their administration of justice. Hearing an unusual commotion among the crows in my garden I went out to see what was the trouble. A large number of crows were assembled and were mostly standing upon the ground. In the midst of them was one which seemed to be the prisoner, and three or four others which were apparently the executioners. They fell upon the prisoner with great violence, pecking him upon the head, pushing him, and pulling his feathers, while the prisoner meekly submitted to his punishment without trying to escape or to retaliate. I did not

learn what crime the prisoner had committed, but, judging from the punishment he received, it must have been very great. When the punishment had been inflicted and justice maintained, the prisoner was released. After standing quietly for a moment he flew away, and was probably ever afterward "a sadder and wiser" crow. The court also adjourned, and the assembly broke up.

It is often mentioned of this crow that it roosts in company, in vast numbers, assembling for that purpose from the whole surrounding country. The late Capt. Beavan says, "At Umballah I have observed crows in large numbers flying along the grand-trunk road over twenty miles of an evening, for the sake of roosting in the station, returning in the morning the same distance." There are some large trees in the Collector's garden at Ahmednuggur which serve as a roosting place for these birds. From before sunset until dark the crows may be seen in great numbers coming from all directions for their night's lodgings, and in the early morning they return again to their various hunting grounds. I will venture to say that they are the most industrious collectors of revenue that emanate from that place.

Acridotheres tristis. The common myna. This is one of our most common and familiar birds, and it is rather a favorite, partly because of its cheerful and *dignified* appearance, and partly because it has such a great variety of notes; more than once have I heard a strange, unknown song, and on going to my window to discover its source have found only my old friend the myna. Some of its notes are not very musical, it is true, but they are always so cheerful, so rollicking, that it is a pleasure to have it about. There is one striking peculiarity about this bird. It has a row of white or silvery specks around its red-brown irises. This when seen near at hand gives it a singular appearance. So far as I know, none of its allies has this peculiarity.

The myna is by no means a timid bird. It is able to stand upon its dignity and to defend its rights when occasion requires. Mr. Hume speaks of a male in defence of his household treasures, "rushing after and soundly thrashing any chance crow (four times his weight at least) that inadvertently passed too near him." I have seen a pair of them in front of my window attacking most furiously a medium sized cobra that came within a few rods of their nest. His snakeship was making the best of his way to a neighboring hedge, when, without waiting for the formality of

putting on my hat, I seized a stick and ran out in the hot mid-day sun to the assistance of the brave birds. After a short conflict the reptile was safely housed in a bottle of alcohol.

The common myna has been successfully introduced into the Mauritius and Andaman Islands. Dr. Carpenter says of this bird, "In the Mauritius, the increase of locusts, which had been accidentally introduced there, and which were becoming quite a pest, was checked by the introduction from India of a species of bird, the grackle, which feeds upon them." (Animal Physiology, Paragraph 149.) Why might it not be introduced into the Southern States of America? It thrives in Northern India in latitude equal to that of the Gulf States, and at an elevation of five thousand feet.

Temenuchus pagodarum. The black-headed myna. This species is more seasonal in its appearance, and is far more quiet and retiring in its habits than the common myna. It is a beautiful little bird, and, as Mr. Hume says, "there is something essentially gentlemanly in his look; he is always so exquisitely glossy, neat and clean, and he always looks so perfectly independent and so thoroughly good humored."

Pastor roseus. The rose-colored starling. The rose-colored starlings are said to breed in Western Asia and in Southern Europe. They make their appearance here during the cold season in time of harvest, and make great devastation in the fields of grain. In the evening they assemble in countless numbers at their chosen roosting places, either in trees, or in a thick growth of prickly-pear. I have seen them in vast cloud-like flocks flying back and forth over their roosting place for several minutes, and then they would suddenly dart, like an arrow, into the prickly pear and settle themselves for the night. On one occasion one of these flocks was fired into on two nights in succession, and on the third night, not a starling was to be seen at that place.

Munia Malabarica. The plain brown munia.

Passer Indicus. The Indian house sparrow. One does not always have to look out of the window to get a glimpse of the Indian house sparrow. They are abundant everywhere, in the house and out of it, and they are as mischievous and impudent as they are common. They are exceedingly industrious and persevering in their mischief, working away for days and weeks at any little hole they may find in the walls and ceiling until they have

enlarged it sufficiently to give entrance to themselves and the rubbish which they require for their nests. Its chirp is loud and shrill, and is continued with such pertinacity as to become extremely annoying. Indeed Dr. Jerdon pronounces this bird and the common squirrel (*Sciurus palmarum*) "two of the greatest pests in India." The ill-mannered creature has no regard for sacred places, but enters the churches and chapels with the utmost freedom, screaming out its loudest notes, being provoked thereto, perhaps, by the singing of the congregation. I have been almost distracted when preaching to a native assembly, by half a dozen or a dozen of these noisy creatures chirping with all their might over my head and in every part of the room. It is of little use to drive them out; for if they are driven out through the door they will come in at the window, and if through the window they will return at the door. Their persistence is more than a match for human patience, nothing short of decapitation seems to be sufficient to keep them from their mischief. I have suddenly closed the doors and windows upon them, and chased them back and forth until in their fright they have fallen helpless to the floor; have taken them in my hand and done everything to frighten them, but out of sheer pity have let them go alive, only to have them return to their work of destruction at the first opportunity.

I have been more particular in describing this bird because of the recent attempt to introduce a closely allied species (*Passer domesticus*) into America. I confess that I look with some apprehension upon these efforts which I believe to be ill-advised and inexpedient. The European house sparrow does not differ essentially in its habits from its Indian ally, and so far as I can learn, it is very generally regarded as a nuisance wherever it abounds. In some parts of England a bounty is placed upon its head and considerable sums of money are paid for its destruction. In Spain it is said by Mr. Howard Saunders to be "as abundant and impudent as elsewhere." The *Passer domesticus* is the common sparrow of Syria, according to the Rev. H. B. Tristram, who says of it, "in its westward migrations it has acquired neither additional impudence, assurance nor voracity." Dr. Thomson also describes these same Syrian sparrows in the following spirited style. He says: "They are a tame, troublesome, and impertinent generation, and nestle just where you don't want them. They stop up your stove and water pipes with their rubbish, build in the windows and under the

beams of the roof, and would stuff your hat full of stubble in half a day if they found it hanging in a place to suit them. They are extremely pertinacious in asserting their right of possession, and have not the least reverence for any place or thing." (Land and Book, Vol. 1, page 58.)

If the sparrow is to be introduced into America to devour the larvæ of insects it should be remembered that it is for the most part a feeder on grain, seeds and buds and that it only makes a business of devouring grubs during its breeding season. If it is true, as has been estimated, that a pair of them will devour four thousand caterpillars a week during their breeding season, still that season continues but a small part of the year, during the remainder of which they may cause a great amount of destruction.

I trust that those who have to do in this matter will act advisedly, lest they should introduce that which will eventually become as great a nuisance, in its way, as the curculio and the cankerworm.

Of the five other species of Indian sparrows only one is found in this region. The *Passer flavidicollis*, or yellow-necked sparrow, is altogether more modest than the preceding, and is, indeed, a very different sort of a bird. It does not intrude itself into the society of man, but frequents thin forest jungle, groves of trees and gardens. It has a very pleasing song which it pours forth from its golden throat, seated upon the topmost twig of some lofty tree.

Emberiza Huttoni. The gray-necked bunting. This can hardly be called a familiar bird in the sense to which we have restricted that term, although I have *twice* seen it gathering its food upon the ground in front of my window; I mention it here more particularly to correct an error in regard to its supposed limited distribution. Dr. Jerdon gives its habitat as the N. W. Himalayas, but thinks it may be "a rare straggler into Western India." Mr. W. T. Blanford obtained four specimens in 1867, in the vicinity of Nagpore and Chanda, and reports them as having "not previously been found so far to the South." Rahouri is considerably farther south than the places mentioned by Mr. Blanford, and I have seen them here in large numbers during the past year. I cannot however explain the apparent suddenness of its appearance. I never saw it to recognize it until two years ago, and then only a few specimens, but during the last cold season it was very common, in various localities of hill and plain.

Euspiza melanocephala. The black-headed bunting is present

in vast multitudes during the cold season, and this year (1871), up to the first week in April, a whole month later than is mentioned by Dr. Jerdon.

Columba intermedia. The blue rock-pigeon.

Turtur Cambayensis. The little brown dove. Very abundant and tame, building its nest sometimes on the verandah within reach of the hand.

Turtur Suratensis. The Spotted Dove. Occasional. Very beautiful.

Turtur risoria. The common ring-dove. Very abundant. This is a very widely distributed species. It is one of the three common doves of Palestine, and is found in Asia Minor, and even in European Turkey and Northern Africa. It has also been introduced into New Zealand.*

Ortygornis Ponticeianra. The gray partridge. Often seen in small companies about the hedges.

Anthropoides virgo. The demoiselle crane. A very common and beautiful sight in the cold season is a flock of these magnificent birds flying overhead. They are generally in a straight or wedge-shaped line, and sometimes form a double line. They usually number from twenty-five to a hundred in a flock, but they sometimes appear in astonishing numbers. Occasionally, too, they rise to an immense height, so as hardly to be visible, or even to disappear behind the clouds. During the day they sit in the sandy beds of rivers, but they are very shy and difficult to approach.

REVIEWS AND BOOK NOTICES.

SCIENTIFIC RECORD.†—We are glad to see that the admirably edited “Scientific Intelligence” which the Messrs. Harper have been publishing of late in their Weekly and Monthly has been put

*I have observed a very curious habit of this bird which I never saw noticed in any published account. A sudden shower of rain was one day falling after some weeks of dry weather. On going to my verandah I saw, not far off, numbers of these birds lying upon the ground, mostly upon one side, with the opposite wing spread and bent as far as possible over the back. I watched them for some time and found that their object was evidently to cool themselves by allowing the large raindrops to fall upon the thinly clad portions of the body under the wing.

† Annual Record of Science and Industry for 1871. Edited by SPENCER F. BAIRD, with the assistance of eminent men of science. New York; Harper and Bros. 1872.